

No.

8800012



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

NBSU Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen** YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS SEED OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'2375'

AMENDED CERTIFICATE

**Original grant February 28, 1989.
In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington, D. C.
this 29th day of March in
the year of our Lord one thousand nine
hundred and ninety-one.*

Attest:

Kenneth K. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Ed Madigan
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) NDSU RESEARCH FOUNDATION Pioneer Hi-Bred International, Inc. Plant Breeding Division Dept. of Cereal Seed Breeding		2. TEMPORARY DESIGNATION XW351	3. VARIETY NAME 2375
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) 1000 W. Jefferson St. P.O. Box 5014 Tipton, IN 46072 FARGO, ND		5. PHONE (Include area code) (317) 675-2101 Ext. 2302 (701) 237-7654	
6. GENUS AND SPECIES NAME Triticum aestivum L.		7. FAMILY NAME (Botanical) Graminae	
8. KIND NAME Wheat		9. DATE OF DETERMINATION October 1984	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation		12. DATE OF INCORPORATION October 29, 1987	
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa		12. DATE OF INCORPORATION October 29, 1987	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. Mark Iwig DR. H.R. LUND Pioneer Hi-Bred International, Inc. NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION 1000 W. Jefferson St. P.O. BOX 5435 Tipton, IN 46072 FARGO, ND 58105 PHONE (Include area code) (701) 237-7654 317-675-2101 Ext. 2302			
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED			
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)			
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement.			
c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)			
d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety.			
e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input checked="" type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No			
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input checked="" type="checkbox"/> Foundation <input type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified	
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No			
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No			

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT

Mark M. Iwig

DATE

10/20/87

SIGNATURE OF APPLICANT

DATE

EXHIBIT A. ORIGIN AND BREEDING HISTORY OF 2375 HARD RED SPRING WHEAT

2375 was developed by Pioneer Hi-Bred International, Inc., Plant Breeding Division, Glyndon Cereal Seed Research Station, Route 1 Box 128A, Glyndon, Minnesota 56547.

The abbreviated parentage of 2375 is W7780/W7710. W7780 is a Pioneer developed line with the pedigree Olaf//Era/Sugamuxi 68. W7710 is a Pioneer developed line with the pedigree Chris/ND487//Lark.

The procedure used to develop 2375 from the time of the final cross was as follows:

- 1979 - F1 generation
- 1979-80 - F2 generation - single heads selected at Yuma, Arizona
- 1980 - F3 generation - headrows from Yuma single head selections were planted at Glyndon. Single head selections were taken from selected rows.
- 1980-81 - F4 generation - single head selections from each selected row were grown at Yuma, Arizona. Individual rows were selected and cut separately in bulk.
- 1981 - F5 generation - selected bulk rows from Yuma were grown in a screening yield test at Glyndon. The selection, later to be 2375, was given the experimental number SBY235.
- 1982 - F6 generation - planted at Glyndon and four off-station testing sites in preliminary yield tests.
- 1983 - F7 generation - grown in advanced yield tests at eight locations and a small increase block and sent to Yuma as headrows.
- 1983-84 - F8 generation - purity headrows from heads picked at Glyndon were grown and off-type rows discarded. Remaining rows were cut as single row bulks and sent to Glyndon.
- 1984 - F8 generation - grown in first year elite yield tests at Glyndon and fifteen off-station locations. Quality evaluations were done at the Pioneer quality lab in Hutchinson, Kansas and at North Dakota State University, Department of Cereal Science and Food Technology.

F9 generation - progeny plots from the Yuma single row bulks were grown. Based on agronomic, disease, and protein % information, four plots were selected, fifty heads picked from each and these heads were sent to the Pioneer lab at Johnston, Iowa for electrophoretic assay of gliaden and glutenin proteins.
- 1984-85 - F10 generation - headrows from heads picked from the best progeny plots at Glyndon were grown at Yuma. Based on electrophoretic assay the purest selection was selected to be advanced. Off-type rows of this selection were discarded, and the rest of the rows cut as single row bulks and sent to Glyndon.

- 1985 - F10 generation - grown in second year elite tests at Glyndon and 14 off-station sites. Quality evaluations were again done at the Pioneer quality lab and at the NDSU quality lab. The experimental designation YW351 was assigned.
- F11 generation - progeny plots from rows of the best selection that were cut at Yuma were grown. Off-type plots were discarded and the rest were combined in bulk.
- 1985-86 - F12 generation - a small breeders seed increase was grown at Yuma.
- 1986 - F12 generation - grown in third year elite tests at Glyndon and 16 off-station locations. Quality evaluations were again conducted by the Pioneer quality lab at Hutchinson, Kansas and the NDSU quality lab. The experimental designation XW351 was assigned.
- F13 generation - a ten acre parent seed increase was grown near Kragnes, Minnesota.
- 1987 - F14 generation - grown in fourth year elite tests at Glyndon and 15 off-station locations. Quality analysis was again conducted at the Pioneer and NDSU quality labs. A 118 acre parent seed increase was grown near Kragnes, Minnesota. The commercial number 2375 was assigned with the sale of commercial seed projected for the fall of 1988 and planting in the spring of 1989.

2375 has shown very good uniformity and stability for all traits as described in Exhibit C. It is moderately insensitive to short photoperiods.

EXHIBIT B. NOVELTY STATEMENT

Exhibits C and D provide information that should aid in identifying 2375. In Exhibit C, Item 20, 2385 is cited as the variety that most closely resembles 2375. The following characters would clearly differentiate 2375 from 2385.

1. 2375 is one day later in heading and one day later in physiologic maturity than 2385, on the average.
2. Normally a waxy bloom is present on the stems and leaves of 2375 at booting but is absent on 2385.
3. Seed size of 2375 is 35 grams per 1000 seeds, 2385 is 30 grams per 1000 seeds, on the average.
4. The glume shoulders of 2375 at maturity are oblique in shape while the glume shoulders of 2385 at maturity are square.

Also resembling 2375 in some characters are Butte, Chris, and Marshall.

Characters clearly differentiating 2375 from Butte are:

1. 2375 is about 6 cm shorter than Butte, on the average.
2. 2375 is resistant to local races of leaf rust while Butte is susceptible.
3. 2375 is white chaffed while Butte is brown chaffed.

Characters clearly differentiating 2375 from Marshall are:

1. 2375 is about 10 cm taller than Marshall, on the average.
2. 2375 is four days earlier in heading than Marshall, on the average.

Characters clearly differentiating 2375 from Chris are:

1. 2375 is 14 cm shorter than Chris, on the average.
2. 2375 is about four days earlier in flowering than Chris.

2375 has shown uniformity and stability for all traits as described in Exhibit C (Form GR470-6), "Objective Description of Variety." Taller variants may be observed at a frequency of about 1 in 15,000 plants.

Table 1. Classification of 2375 and standard HRS wheat varieties for photoperiod response based on the effects of a five-hour night interruption by a field lighting system at Yuma, Arizona, 1985-86, 1986-87.

Variety	Delay (Days) Due To Absence Of Lights*	
	50% Heading	Phys. Maturity
	Two Year Average	
2375	7.0	4.0
2385	7.3	9.2
2369	8.5	5.5
Marshall	17.5	14.5
Len	21.0	14.0
Butte	8.0	8.5

* night interruption commenced eight weeks after seeding

- simulated "long day" = 5 hours of illumination
9:30 PM-2:30 AM

- short day = no lights, about a 12 hour normal day length

Table 2. Performance of 2375 and standard varieties grown in elite yield tests for 46 location-years during the period 1984-1986.

Variety	Days to 50% Head*	Days to Maturity	Height CM	Lodging Score*	Yield - Bu/Acre Region I** Region II**	Test Wt. (Lbs/Bu)	Harvest Moist(%)	Leaf Rust	Stem Rust	Leaf Blight*
2375	61	95	85	7.2	74.0	58.6	14.1	R	R	4.6
2385	60	96	86	7.8	71.0	57.9	13.9	R	R	5.1
2369	63	97	80	7.2	70.0	57.9	14.4	MS	R	4.9
Marshall	65	98	78	8.0	73.0	56.7	14.7	MR-MS	R	5.4
Butte	61	96	91	6.9	64.5	56.9	13.9	MS-S	R	3.6
Len	64	98	82	7.7	67.0	56.4	14.1	R-MR	R	5.0

* Number of days from planting to 50% heading

Number of days from planting to physiologic maturity

Scale of 1-9 where 9 = excellent and 1 = poor

** Region I: Minnesota and Red River Valley locations in North Dakota

Region II: Locations west of the Red River Valley in North Dakota and South Dakota

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (TRITICUM SPP.)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S) Pioneer Hi-Bred International, Inc.	FOR OFFICIAL USE ONLY
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) Plant Breeding Division Dept. of Cereal Seed Breeding 1000 W. Jefferson St., Tipton, IN 46072	PVPO NUMBER 8800012 VARIETY NAME OR TEMPORARY DESIGNATION 2375

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g., 089 or 09) when number is either 99 or less or 9 or less.

1. KIND:

1 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

1 1 = SPRING 2 = WINTER 3 = OTHER (Specify) 2 1 = SOFT 2 = HARD 3 = OTHER (Specify)

2 1 = WHITE 2 = RED 3 = OTHER (Specify)

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

056 FIRST FLOWERING 059 LAST FLOWERING

4. MATURITY (50% Flowering):

04 NO. OF DAYS EARLIER THAN 3 1 = ARTHUR 2 = SCOUT 3 = CHRIS
 NO. OF DAYS LATER THAN 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (From soil level to top of head):

085 CM. HIGH
 CM. TALLER THAN 1 = ARTHUR 2 = SCOUT 3 = CHRIS
14 CM. SHORTER THAN 3 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (See reverse):

3 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN 1 1 = YELLOW 2 = PURPLE

8. STEM:

1 Anthocyanin: 1 = ABSENT 2 = PRESENT 2 Waxy bloom: 1 = ABSENT 2 = PRESENT
2 Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT 1 Internodes: 1 = HOLLOW 2 = SOLID
04 NO. OF NODES (Originating from node above ground) 22 CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

1 Anthocyanin: 1 = ABSENT 2 = PRESENT 1 Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

2 Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (Specify) 2 Flag leaf: 1 = NOT TWISTED 2 = TWISTED
1 Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT 2 Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
13 MM. LEAF WIDTH (First leaf below flag leaf) 20 CM. LEAF LENGTH (First leaf below flag leaf)

11. HEAD:

Density: 1 = LAX 2 = DENSE
 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE
 4 = OTHER (Specify) _____

Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
 5 = BROWN 6 = BLACK 7 = OTHER (Specify) _____

CM. LENGTH
 MM. WIDTH

12. GLUMES AT MATURITY:

Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)
 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED
 4 = SQUARE 5 = ELEVATED 6 = APICULATE
 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL
 Check: 1 = ROUNDED 2 = ANGULAR

Brush: 1 = SHORT 2 = MEDIUM 3 = LONG
 Brush: 1 = NOT COLLARED 2 = COLLARED

Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN
 4 = BROWN 5 = BLACK

Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

MM. LENGTH
 MM. WIDTH
 GM. PER 1000 SEEDS

17. SEED CREASE:

Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
 2 = 80% OR LESS OF KERNEL 'CHRIS'
 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'
 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'
 2 = 35% OR LESS OF KERNEL 'CHRIS'
 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

STEM RUST (Races) 15 TLM, TNM
 LEAF RUST (Races) Local Races
 STRIPE RUST (Races)
 LOOSE SMUT

POWDERY MILDEW
 BUNT
 OTHER (Specify) Leaf Blight Complex

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

SAWFLY
 APHID (Bydv.)
 GREEN BUG
 CEREAL LEAF BEETLE

OTHER (Specify) _____
 HESSIAN FLY RACES:
 GP
 A
 B
 C

D
 E
 F
 G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	2385	Seed size	Butte
Leaf size	Chris	Seed shape	Butte
Leaf color	Marshall	Coleoptile elongation	2385
Leaf carriage	2385	Seedling pigmentation	2385

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggie and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

2375 is a common Hard Red Spring Wheat, Triticum aestivum L.

Over the three year period 1984-86 at Glyndon, Minnesota, 2375 averaged 2 days earlier from planting to first flowering than 2369 (61 vs 63 days) and 4 days earlier than Marshall (61 vs 65 days) (Table 2). The corresponding days from planting to physiologic maturity were 95, 97, and 98 days for 2375, 2369, and Marshall, respectively.

2375 is a semidwarf variety with an average height of 85 cm, about 5 cm taller than 2369 and 6 cm shorter than Butte.

At boot stage the plant color of 2375 is blue-green and anthocyanin is not present in the stems. Waxy bloom is present on the stems at late boot stage. Auricles are glabrous and no anthocyanin is present. Anther color is yellow. Internodes of 2375 are hollow, stems are strong and yellow at harvest. Normally four nodes are present above ground and the internode between the flag leaf and the leaf below averages .22 cm.

Leaves are blue-green at the booting stage and flag leaf is recurved and twisted. There is waxy bloom on the flag leaf sheath and hairs on the first leaf sheath are absent. The first leaf below the flag leaf averages 13 mm wide and 20 cm long.

Heads are mid-dense, oblong, awned, yellow and average 8 cm in length and 12 mm wide. Glumes at maturity are of medium length and wide width with acuminate shoulders and the beak is acuminate.

Coleoptile color is white and seedling anthocyanin is absent. Juvenile growth habit is erect.

Kernels are red in color, ovate in shape with rounded cheeks, and a deep crease. Seeds average 7 mm long, 5 mm wide and have a 1000 kernel weight of about 35 grams. The brush is medium and not collared. Phenol reaction is brown.

2375 is resistant to the major stem rust races. It is resistant to the local races of leaf rust. It has also shown moderate susceptibility to leaf blight complex diseases. 2375 has not been tested for loose smut resistance but shows good field tolerance. It has not been tested for powdery mildew, bunt or stripe rust resistance.

2375 is susceptible to the Great Plains race of Hessian fly and has not been tested for sawfly, aphids, greenbugs or cereal leaf beetle, although it is assumed to be susceptible to all of these.

2375 has a very good yield record when compared with the current commercial hard red spring wheats (Table 2). It is well adapted over a wide range of environments and offers the advantages of early heading, maturity, high test weight, very good leaf rust, stem rust, heat and drought stress resistance or tolerance and adequate straw strength.

2375 has satisfactory milling and baking characteristics. Flour yield and water absorption are better than or equal to Len and 2369, grain and flour protein are higher than 2369 but lower than Len, loaf volume is lower than Len and less than or equal to 2369, and dough and loaf characteristics are adequate. These data are provided in Tables 3 and 4.

Table 3. Results of quality testing of 2375 by Pioneer Quality Laboratory 1984-1986

Variety	TKW (Grams)	Grain Protein(%)	Flour Protein(%)	Flour yield(%)	Water Abs.(%)	Loaf Volume(cc)	Mix* Time	Mixing* Tolerance
2375	34.7	14.9	14.0	71.6	64.0	72.6	3.4	3.3
2385	30.2	15.1	14.2	71.0	64.6	74.0	3.9	4.0
2369	31.4	14.5	13.9	70.7	63.9	74.3	5.5	7.5
Marshall	28.3	14.2	13.7	70.9	62.6	72.7	3.1	2.1
Butte	30.1	14.5	13.8	70.7	63.5	71.4	3.2	3.0
Len	32.4	15.4	14.5	70.2	64.4	79.7	4.3	5.9

Notes: 1. Data are averages of 1984 through 1986.

2. Quality tests were conducted on 15 location composite samples in 1984, 14 location composite samples in 1985, 17 location composite samples in 1986.

3. Mix time and mixing tolerance were determined with a mixograph. Time = minutes; tolerance = scale of 1-9 where 3-7 is satisfactory.

Table 4. Results of quality testing of 2375 by North Dakota State University, Fargo, ND 1984-87

Variety	Test Wt. (Lb/Bu)	Grain Pro(%)	Flour Pro(%)	Flour Yield(%)	Ash (%)	Water Abs(%)	Loaf Vol(cc)	Grain** Text.	Crumb** Color	Farin+ Class	Peak* Time	Mix* Tol	MTI++
2375	61.0	14.5	13.7	67.8	.45	67.2	882.5	7.9	8.1	6.0	9.4	11.9	21.3
2385	59.6	14.7	13.8	70.6	.44	67.1	883.8	8.1	8.5	7.3	14.3	15.1	13.8
2369	60.1	14.0	13.3	69.4	.45	62.5	870.0	8.1	8.5	6.5	12.0	15.6	15.0
Len	59.8	15.1	14.3	69.7	.47	66.4	971.3	8.3	7.5	6.8	12.5	16.9	22.5

Notes: 1. Data are 1984 through 1987 averages.

2. A 15 location composite was used in 1984, a 14 location composite was used in 1985, a 17 location composite was used in 1986, and a 16 location composite was used in 1987.

3. * Peak time and mix tolerance were determined with a farinograph. Time = minutes, tolerance = time in minutes that curve remains horizontal.

4. ** Score of 1-10 with higher number more desirable.

5. + Score of 1-8 with 5-8 considered satisfactory.

6. ++ Relatively low value more desirable.

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Pioneer Hi-Bred International, Inc., Plant Breeding Division, believes it is the sole, original and first breeder of the 2375 variety of hard red spring wheat for which it solicits a certificate of protection.

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WHEAT DONATION AGREEMENT

Agreement made this 17th day of July, 1990 between Pioneer Hi-Bred International, Inc., an Iowa Corporation, with offices at 700 Capital Square, 400 Locust Street, Des Moines, Iowa 50309, (Pioneer) and the NDSU Research Foundation, a North Dakota non-profit corporation, whose address is P. O. Box 5051, State University Station, Fargo, North Dakota 58105-5165 (the Foundation).

RECITALS

Whereas, Pioneer has decided to discontinue its research and development of hard red spring wheat varieties and the marketing and sale of such varieties in North America; and

Whereas, Pioneer desires to ensure the continued availability of said hard red spring wheat varieties and germplasm to the public; and

Whereas, the Foundation has the ability to maintain and develop said varieties and germplasm and to make them available to the public;

Now therefore the parties agree as follows:

I. GERMPLASM

A. Pioneer agrees to donate and assign to the Foundation, all of its right, title and interest including assignment of PVP certificates to the hard red spring wheat varieties listed below:

2369, 2375, 2370 and XW371

B. The donation shall include:

2369	Foundation:	478
	Registered:	14
2370	Breeder Seed:	12
	Foundation:	607
	Registered:	4362
	Head Row Pkts:	3300
	Plot Pkts	201
2375	Breeder Seed:	15
	Foundation:	1189
	Registered:	8170
	Head Row Pkts:	3000
	Plot Pkts:	209

8800012

XC371 Breeder Seed: 12
Foundation: 400
Head Row Pkts: 5000
Plot Pkts: 206

C. The Foundation understands and agrees that Pioneer® brand hard red spring wheat varieties will be made available for sale by Pioneer sales representatives through the 1990 sales season.

D. Pioneer agrees to donate to the Foundation all of its right, title, and interest except as restricted in Section II.A. below, to the following hard red spring germplasm lines:

Approximately 2300 F2 and F3 bulk populations;

Approximately 6500 F4, F5, and F6 selected lines;

Approximately 2700 lines of F7 and above generation with seed quantities adequate for yield testing.

including but not limited to seed stock, pedigree information, field books, quality and testing data,

II. RESTRICTIONS

A. The Foundation understands and agrees that the donation of the varieties and germplasm is restricted to development of varieties and sale of seed in North America only. The Foundation agrees to use its best efforts to prevent the distribution of the varieties and germplasm outside of North America.

B. The Foundation will not be permitted to use the name Pioneer® or any other registered trademark or service mark of Pioneer Hi-Bred International, Inc. in any manner whatsoever without the express written permission of Pioneer. The Foundation may use the variety numbers listed on the Plant Variety Protection certificates.

C. It is the hope and desire of Pioneer that the Foundation share the donated varieties and germplasm with other land grant institutions, specifically the University of Minnesota and South Dakota State University.

III. ANNOUNCEMENT AND EFFECTIVE DATE

A. The effective date of this Agreement shall be March 14, 1990.

IV. LIMITATION OF LIABILITY

A. Pioneer makes no warranty express or implied as to the yield, quality or tolerance to diseases, insects, or growing conditions of the varieties or the germplasm.

V. REPRESENTATIVES

A. All notices and correspondence shall be directed to the following representatives:

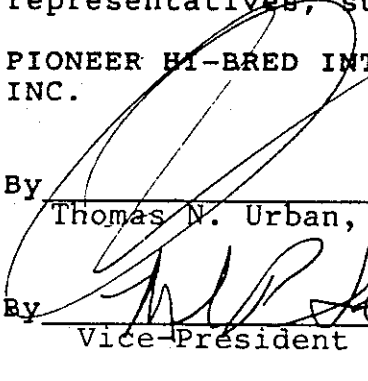
Pioneer: C. Sue Crum
Manager, Business Development
Pioneer Hi-Bred International, Inc.
317 6th Avenue, Suite 720
Des Moines, Iowa 50309

Foundation: Earl Foster, Chairperson
Crop and Weed Sciences Department
North Dakota State University
Box 5051 State University Station
Fargo, North Dakota 58105-5051

This Agreement constitutes the entire agreement and understanding between the parties and all previous discussions, representations, understandings or agreements are hereby merged in this Agreement.

This Agreement shall be binding upon the legal representatives, successors and assigns of the Parties.

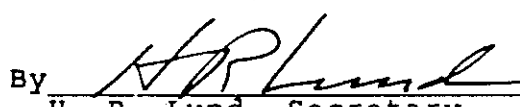
PIONEER HI-BRED INTERNATIONAL,
INC.

By  Thomas N. Urban, President

By  Vice-President Research

NDSU RESEARCH FOUNDATION

By  G.L. Ozburn, President

By  H. R. Lund, Secretary

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